

Audrey Olmsted '27

Franklin Lab Internship

Fall 2025

This past fall, I used my Byrne Scholars funds to intern in the Franklin Lab at the Hawaii Institute of Marine Biology. My primary focus was on building an AI tool to identify marine organisms from underwater video footage. I began by learning about common Hawaiian reef fish and constructing a large, annotated dataset. Upon completing my time in the lab, the dataset consisted of 2000 images with around 17000 annotations, representing 76 different species. I trained and evaluated object detection models (primarily RF-DETR), learning about model behavior, evaluation metrics, annotation strategies, and preprocessing decisions. We consulted fish experts and computer vision professionals to ensure our process was optimized. As the project matured, I transitioned to custom training and evaluation scripts that I coded. I addressed frame-to-frame inconsistencies in video predictions by implementing ByteTrack's tracking model to assign consistent species IDs across an entire video. From this, I was able to calculate the N-max, a metric used by the lab for fish population analyses. To support continuity after my internship, I wrote a detailed SOP documenting methods, decisions, resources, and recommended next steps.

I also contributed to evaluating bias in satellite-based ocean temperature measurements for nearshore waters by acquiring, cleaning, and analyzing multiple long-term Kaneohe Bay and satellite temperature datasets. I conducted preliminary statistical analyses, trend tests, and change point analyses, visualized results, and handed off a clear project plan and codebase to another undergrad in the lab to complete the work.

In addition to these projects, I was able to audit a Time Series Analysis class at the University of Hawaii. I participated in a field day testing a surface robot equipped with advanced camera systems. I toured the Oceanic Institute of Hawai'i Pacific University, a non-profit research and development organization dedicated to aquaculture, biotechnology, and coastal resource management. I attended a lab member's PhD dissertation defense and sat in on other Hawaii Institute of Marine Biology seminars. I also attended the International Conference on Computer Vision at the Hawaii Convention Center in Honolulu. Finally, I had lots of fun at multiple lab socials throughout the semester.

This experience was only possible with the generous support of the Byrne Scholars Program and donors. Thank you so much for the opportunity.